

SIMATIC S7-400 advanced controller

Function modules

FM 455 controller module

1

Overview



- 16-channel closed-loop control module for universal control tasks
- Can be used for temperature, pressure and flow controls
- Convenient online self-optimization for temperature controls
- Predefined controller structures
- 2 control algorithms
- 2 versions:
 - FM 455 C as continuous controller
 - FM 455 S as step or pulse controller
- With 16 analog outputs (FM 455 C) or 32 digital outputs (FM 455 S) for actuators

Technical specifications

Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 FM 455 S controller module
Product type designation		
Supply voltage		
Load voltage L+		
• Rated value (DC)	24 V	24 V
• permissible range, lower limit (DC)	20.4 V	20.4 V
• permissible range, upper limit (DC)	28.8 V	28.8 V
Input current		
from load voltage L+ (without load), max.	440 mA; typ. 370 mA	400 mA; typ. 330 mA
Power losses		
Power loss, typ.	12 W	10.7 W
Power loss, max.	17.3 W	16.2 W
Digital inputs		
Number of digital inputs	16	16
Input characteristic curve in accordance with IEC 61131, type 2	Yes	Yes
Input voltage		
• Rated value (DC)	24 V	24 V
• for signal "0"	-3 to +5V	-3 to +5V
• for signal "1"	13 to 30V	13 to 30V
Input current		
• for signal "1", typ.	7 mA	7 mA
Cable length		
• shielded, max.	1 000 m	1 000 m
• Unshielded, max.	600 m	600 m
Digital outputs		
Number of digital outputs		32
short-circuit protection		Yes; Electronic
Limitation of inductive shutdown voltage to		L+ (-1.5 V)
Controlling a digital input		Yes
Switching capacity of the outputs		
• on lamp load, max.		5 W

Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 FM 455 S controller module
Load resistance range		
• lower limit		240 Ω
• upper limit		4 kΩ
Output voltage		
• for signal "1", min.		L+ (-2.5 V)
Output current		
• for signal "1" rated value		0.1 A
• for signal "1" permissible range for 0 to 60 °C, min.		5 mA
• for signal "1" permissible range for 0 to 60 °C, max.		150 mA
• for signal "0" residual current, max.		0.5 mA
Parallel switching of 2 outputs		
• for logic links		Yes
Switching frequency		
• with resistive load, max.		100 Hz
• with inductive load, max.		0.5 Hz
• on lamp load, max.		100 Hz
Cable length		
• shielded, max.		1 000 m
• Unshielded, max.		600 m
Analog inputs		
Number of analog inputs	16; With thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection	16; With thermo- couples or 2-wire connection; 8 with Pt 100 or 4-wire connection
permissible input voltage for voltage input (destruction limit), max.	20 V	20 V
permissible input current for current input (destruction limit), max.	40 mA	40 mA

Technical specifications (continued)

Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 FM 455 S controller module	Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 FM 455 S controller module
Input ranges (rated values), voltages			Load impedance (in rated range of output)		
• 0 to +10 V	Yes	Yes	• with voltage outputs, min.	1 kΩ	
• -1.75 V to +11.75 V	Yes	Yes	• with voltage outputs, capacitive load, max.	1 μF	
• -80 mV to +80 mV	Yes	Yes	• with current outputs, max.	500 Ω	
Input ranges (rated values), currents			• with current outputs, inductive load, max.	1 mH	
• 0 to 20 mA	Yes	Yes	Cable length		
• 0 to 23.5 mA	Yes	Yes	• shielded, max.	200 m; 50 m at 80 mV and thermocouples	
• -3.5 mA to +23.5 mA	Yes	Yes	Analog value creation		
• 4 mA to 20 mA	Yes	Yes	Measurement principle	integrating	integrating
Input ranges (rated values), thermoelements			Integration and conversion time/resolution per channel		
• Type B	Yes	Yes	• Resolution with overrange (bit including sign), max.	14 bit; 12 or 14 bit, parameterizable	14 bit; 12 or 14 bit, parameterizable
• Type J	Yes	Yes	• Conversion time (per channel)	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz; 20 ms for 50 Hz; for 14 bit: 100 ms for 50 and 60 Hz	16.67 ms; for 12 bit: 16 2/3 ms for 60 Hz; for 14 bit: 100 ms for 50 and 60 Hz
• Type K	Yes	Yes	Settling time		
• Type R	Yes	Yes	• for resistive load	0.2 ms	0.1 ms
• Type S	Yes	Yes	• for capacitive load	3.3 ms	3.3 ms
Input ranges (rated values), resistance thermometer			• for inductive load	0.5 ms	0.5 ms
• Pt 100	Yes	Yes	Encoder		
Thermocouple (TC)			Connection of signal encoders		
Temperature compensation			• for voltage measurement	Yes	Yes
- internal temperature compensation	Yes; Parameterizable	Yes; Parameterizable	• for current measurement as 4-wire transducer	Yes	Yes
- external temperature compensation with Pt100	Yes; Parameterizable	Yes; Parameterizable	Connectable encoders		
Characteristic linearization			• 2-wire sensor	Yes	Yes
• Parameterizable	Yes	Yes	- Permissible quiescent current (2-wire sensor), max.	1.5 mA	1.5 mA
- for thermocouples	Type B, J, K, R, S	Type B, J, K, R, S	Errors/accuracies		
- for resistance thermometer	Pt100 (standard)	Pt100 (standard)	Linearity error (relative to input range), (+/-)	0.05 %	0.05 %
Cable length			Temperature error (relative to input range), (+/-)	0.005 %/K	0.005 %/K
• shielded, max.	200 m; 50 m at 80 mV and thermocouples	200 m; 50 m at 80 mV and thermocouples	Linearity error (relative to output range), (+/-)	0.05 %	
Analog outputs			Temperature error (relative to output range), (+/-)	0.02 %/K	
Number of analog outputs	16		Operational limit in overall temperature range		
Voltage output, short-circuit protection	Yes		• Voltage, relative to input area, (+/-)	+/-0.6 to +/-1 %	+/-0.6 to +/-1 %
Voltage output, short-circuit current, max.	25 mA		• Current, relative to input area, (+/-)	+/-0.6 to +/-1 %	+/-0.6 to +/-1 %
Current output, no-load voltage, max.	18 V		• Resistance thermometer, relative to input area, (+/-)	+/-0.6 to +/-1 %	+/-0.6 to +/-1 %
Output ranges, voltage			• Voltage, relative to output area, (+/-)	0.5 %	
• 0 to 10 V	Yes		• Current, relative to output area, (+/-)	0.6 %	
• -10 V to +10 V	Yes				
Output ranges, current					
• 0 to 20 mA	Yes				
• -20 mA to +20 mA	Yes				
• 4 mA to 20 mA	Yes				
Connection of actuators					
• for voltage output two-wire connection	Yes				
• for current output two-wire connection	Yes				

SIMATIC S7-400 advanced controller

Function modules

FM 455 controller module

1

Technical specifications (continued)

Article number	6ES7455-0VS00-0AE0 FM 455 C controller module	6ES7455-1VS00-0AE0 FM 455 S controller module
Basic error limit (operational limit at 25 °C)		
• Voltage, relative to input area, (+/-)	+/-0.4 to +/-0.6 %	+/-0.4 to +/-0.6 %
• Current, relative to input area, (+/-)	+/-0.4 to +/-0.6 %	+/-0.4 to +/-0.6 %
• Resistance thermometer, relative to input area, (+/-)	+/-0.4 to +/-0.6 %	+/-0.4 to +/-0.6 %
• Voltage, relative to output area, (+/-)	0.4 %	
• Current, relative to output area, (+/-)	0.5 %	
Interference voltage suppression for $f = n \times (f_1 \pm 1 \%)$, $f_1 =$ interference frequency		
• Series mode interference (peak value of interference < rated value of input range), min.	40 dB	40 dB
• common mode voltage (USS < 2.5 V), min.	70 dB	70 dB
Interrupts/diagnostics/status information		
Substitute values connectable	Yes; Parameterizable	Yes; Parameterizable
Control technology		
Number of closed-loop controllers	16; With thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection	16; With thermocouples or 2-wire connection; 8 with Pt 100 or 4-wire connection
Galvanic isolation		
Galvanic isolation controller		
• between the channels	No	No
• between the channels and the backplane bus	Yes; Optocoupler	Yes; Optocoupler
Permissible potential difference		
between inputs and MANA (UCM)	2.5 V DC	2.5 V DC
between M internally and the inputs	75V DC/60V AC	75V DC/60V AC
Isolation		
Isolation checked with	500 V DC	500 V DC
Connection method		
required front connector	2x 48-pin	2x 48-pin
Dimensions		
Width	50 mm	50 mm
Height	290 mm	290 mm
Depth	210 mm	210 mm
Weights		
Weight, approx.	1 400 g	1 400 g

Ordering data

Article No.

FM 455 C controller module
with 16 analog outputs
for 16 continuous controllers

6ES7455-0VS00-0AE0

FM 455 S controller module
with 32 digital outputs
for 16 step or pulse controllers

6ES7455-1VS00-0AE0

Front connectors

48-pin

- with screw contacts, 1 item
- with screw contacts, 84 items
- with spring-loaded terminals, 1 item
- with crimp contacts, 1 item
- with crimp contacts, 84 items

6ES7492-1AL00-0AA0

6ES7492-1AL00-1AB0

6ES7492-1BL00-0AA0

6ES7492-1CL00-0AA0

6ES7492-1CL00-1AB0